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# The Use of Mnemonic Training as a Strategy for Teaching Spelling to Learning Disabled Sixth, Seventh, and Eighth Grade Students

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THE USE OF MNEMONIC TRAINING  
AS A STRATEGY FOR TEACHING SPELLING  
TO LEARNING DISABLED SIXTH, SEVENTH, AND EIGHTH GRADE  
STUDENTS

THESIS

Submitted to the Graduate Committee of the  
Department of Education and Human Development  
Faculty of Education  
State University of New York  
College at Brockport  
in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Education

by

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## Chapter I

### Statement of the Problem

#### Purpose

The purpose of this study was to investigate the effectiveness of mnemonic training on the spelling abilities of 6th, 7th, and 8th grade learning disabled students.

#### Need for the Study

The current cry of "back to the basics" along with the demand that high school students must pass a competency test before receiving a diploma has increased word phobia for many children. Perhaps the wrong methods for teaching basic skills are being used to increase word knowledge for reading, writing and spelling. It is believed that language arts curricula are intensely preoccupied with verbal knowledge because it is easier to quantify and measure at the surface level than intuition, creativity and synthesis. Some maintain that schools must integrate both verbal and nonverbal components into the educational framework of the basic movement.

A common approach to handling the spelling problems of students with severe spelling difficulties is to focus on phonics and rote memorization (components that are verbal in nature). It is believed that a program such as this based on the part-to-whole model neglects the full potential

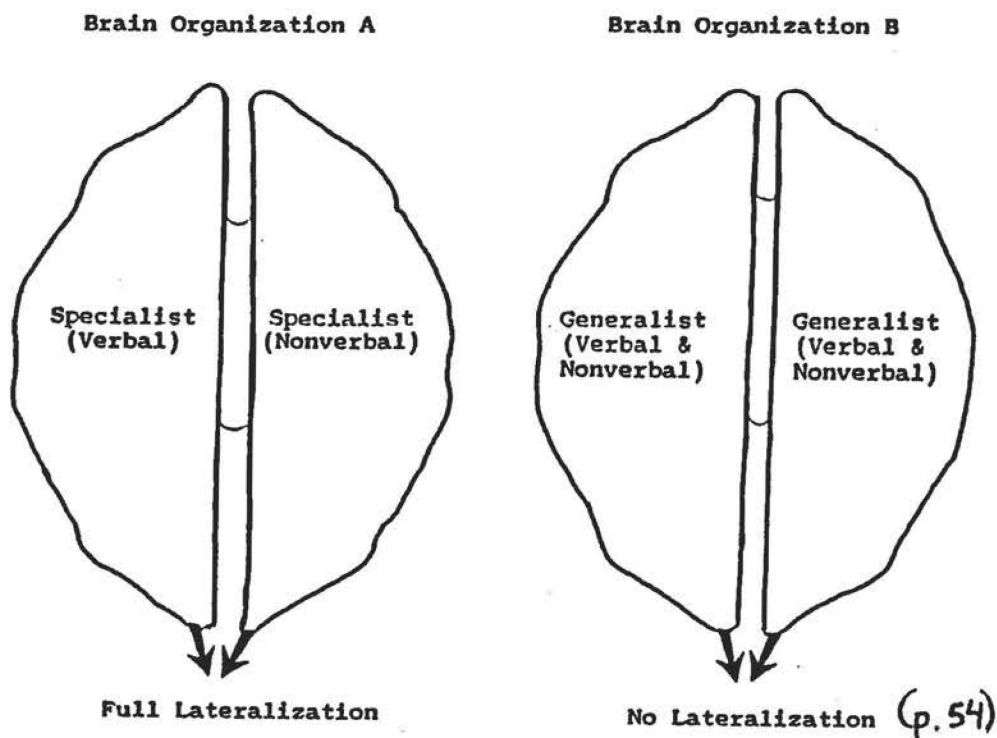
of children's thinking. As a result, points of controversy have arisen concerning how spelling should be taught. The search continues for a more holistic approach to teaching spelling, an approach that supports more than just one half of the brain's processing capacities.

The human brain is "the most biological system known to man," (Schnitker, 1972, p. 3). Its left and right hemispheres weigh close to three pounds. Although they are separate structures at birth, they become "connected by a massive bundle of approximately two hundred million nerve fibers called the corpus callosum" (Vitale, 1982, p. 1). These nerve fibers allow the mirror-like sides of the two hemispheres to communicate and transmit memory and learning.

Both hemispheres of the brain separately receive and process information from the environment. The right hemisphere processes information like a kaleidoscope. "The right-brained person thinks whole-to-part, holistically" (Vitale, 1982, p. 11). This person will start with the answer, a total concept, and by simultaneous processing will then discover the parts that have made this conclusion. The left hemisphere works like a computer. "A left-brained person looks at parts and sequences them to make a whole" (Vitale, 1982, p. 11). This person will take small items, line them up in a correct order and make a conclusion.

There are several different ways of processing information. "One of the two chief ways is on the verbal level, or through the use of language. The other is on the nonverbal level or through visual images; for example, a striking view of the Grand Canyon, a diagram of how to put together a toy bridge, or a photograph of a crater on the moon" (Gallant, 1976. p. 40).

Blakeslee (1980) provides a model to show the two types of brain organizations that account for the range of individual differences among humankind.



Brain organization A depicts the lateralization profile of most of the population. In the words of Levy (1977), "The evolution of cerebral lateralization for humans meant the evolution of two separate genetic blueprints for the the neutral organizations underlying logical, analytic processing on the one side, and analogical, holistic functions on the other. In the well-lateralized brain shown in organization A, these two blueprints are separately expressed in the specialities of the two hemispheres and allow for the doubling of the cognitive capacity" (p. 265).

Brain organization B shows how each hemisphere can process both verbal and nonverbal information equally well. "Here we see the partnership of two generalists. This organization may allow for less disabled functioning in either verbal or nonverbal reasoning since each partner is checking on the other's mental calculations while a task is being processed" (Sinatra, 1983, p. 54).

Galín (1976) believes that the critical factor in the development of lateral specialization is competitive interaction between the hemispheres and that the nerve bridge regulates facilitation or interference of one hemisphere with the other. Since most children are not totally left-brained or totally right-brained and since it is difficult for some to learn in our educational system, educators must take the time and effort to understand how

verbal and nonverbal message forms differ from each other and how these differences are reflected in the two brain hemispheres. No longer can it be supposed that since language skills are in the left brain, the left brain must be the dominant brain hemisphere. It would seem, therefore, that in the "back to the basics" move in in reading and spelling, educators need to find the best way of impressing information into the memory of the whole brain. (Fillmer & deKane, 1980).

Research on the role of memory in reading and spelling, particularly as it relates to the disabled reader, has increased substantially in the last eight years. Evidence has accumulated which indicates that reading disabled youngsters, as a group, perform more poorly than normal children on tasks involving memory skills (Berger & Perfetti, 1977; Pelham & Ross, 1977). Some researchers have even suggested that reading disability may result from deficiencies in memory skills rather than in perception (Morrison, Giordani, & Nagy, 1977). The practical question that comes to mind with these findings is whether memorizing is a skill that can be improved by special means. According to Torgesen (1977), certain memory deficits in disabled readers may be overcome by instruction in the use of mnemonic strategies.

Mnemonic learning strategies, named for Mnemosyne, the Greek goddess of memory, are cognitive devices developed to aid memory.

"Memonics rely on specific learning that provides cues for the more extensive or difficult material that is to be remembered. For example, young musicians recall the word 'face' and the sentence 'Every good boy does fine' when naming the notes on a staff" (Negin, 1978, p. 180).

Articles in the field of education have frequently suggested that mnemonic devices be coupled with spelling instruction, particularly when dealing with unpredictable words which are sometimes called demons.

#### Questions

In view of the supporting evidence concerning mnemonic strategies (particularly the keyword method and visual imagery) and evidence concerning the development of teaching methodologies which will effectively teach to both brain modes, the present study was designed to explore the following questions:

1. Is there a significant difference in the spelling ability of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group?
2. Is there a significant difference in the spelling ability of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group in applying correctly spelled words in a dictated paragraph?

## Definitions

Learning Disabled (LD) an individual whose learning has been impaired both in specific areas of verbal and/or nonverbal learning, but whose potential for learning is categorized as normal or above. This individual falls within the 90 and above IQ range in either the verbal or the nonverbal area.

Memory the re-creation of knowledge after a period of time during which one were not thinking of that knowledge.

Mnemonic Device a technique which aids the memory.

Keyword Method a two-stage procedure for remembering materials that have an associative component. During the first stage, (the acoustical stage), an unfamiliar stimulus term is transformed into a "keyword," which is a familiar word, acoustically similar to the stimulus and easily pictured (e.g., to remember that the English word ranid means frog, ranid is first recoded as rain). During the second stage, (the imagery link stage), a visual image is created in which the keyword proxy for the original stimulus and the to-be-associated information are interacting (e.g., visualize a frog sitting in the rain. Therefore, when the learner is asked to recall the meaning of ranid, a systematic retrieval path is available: ranid leads directly to the keyword rain, which leads directly to the picture of the frog in the rain, which in turn enables the response frog.)



Visual Imagery the act of constructing a mental image of concrete information to be memorized.

Visual Imagery Mnemonic Device a technique which requires the act of drawing, to the best of one's ability (stick figures may be used), the mental image of concrete information constructed in one's mind.

Mnemonic Group a group of subjects trained to use the Keyword and Visual Imagery mnemonic devices to aid the memory in spelling a word.

Non-Mnemonic Group the control group of subjects who have not been trained to use mnemonic devices to aid in the spelling of a word.

#### Limitations of the Study

The findings of this study are limited in their application based upon the following conditions:

1. The findings of this study are applicable only to classes of sixth, seventh and eighth grade learning disabled students in a similar school environment and exposed to the same conditions as those of the study.
2. The results of this study are valid only with students who receive the same amount and type of training as the students in this study.
3. The study was only limited to two mnemonic devices (visual imagery and the keyword method).

4. The study covered only a ten-week teaching period.
5. The study involved only 31 subjects.

### Summary

A variety of approaches to teaching spelling with differing theoretical bases are currently being used. Teachers are continually concerned about which methods will be most successful in teaching students to spell.

In light of the positive viewpoints regarding the use of mnemonic devices in teaching spelling, it is evident that further investigation is needed to determine its effectiveness with learning disabled students.

According to Joseph E. Bogen of the University of Southern California School of Medicine, "Learning of almost any idea is likely to be better if both [brain hemispheres] are involved" (cited in Gallant, 1976, p. 47). In regard to the teaching of spelling then, the spelling of a word must be presented in both a verbal and nonverbal way.

Determining if these two mnemonic strategies are most effective in teaching spelling is the key issue of this study. Do self-generated pictures aid the child in acquiring spelling responses by creating meaningful associations, which are transferred and later enable the child to spell words in isolation and in functional writing? Does the carefully constructed sentence which

provides memory cues (mnemonics) make correct spelling retrieval more efficient? In contrast, do self-generated pictures (visual images) and self-generated sentence constructions with memory cues act as distracting stimuli for directing attention away from the spelling of the word?

The results of this investigation will contribute to the body of literature already available concerning the use of mnemonic devices in spelling instruction. In addition, some further insight into these controversial questions may be forthcoming.

## Chapter II

### Review of the Literature

The purpose of this study was to investigate the effectiveness of mnemonic training on spelling abilities of 6th, 7th, and 8th grade learning disabled students. The following research relating to this study included: characteristics of an effective spelling program, learning disabilities, memory and mnemonic techniques, brain research and art education as they relate to visual imagery, and the keyword method.

#### Characteristics of an Effective Spelling Program

Ask school teachers with varied years of teaching experience to list ways of teaching spelling and one would receive a variety of responses. How spelling is taught ranges from focusing on word parts (phonemes, syllables, inflectional endings, homophones, and affixes) to emphasizing whole language development by incorporating spelling instruction with the other language arts. Considerable controversy surrounds many existing and proposed spelling programs. This controversy centers on several factors, including the relationship of writing to spelling and the regularity of sound-symbol correspondences in English.

Most school teachers view the improvement of spelling ability as a basic need and are seeking practices

which lead to spelling improvement. In a massive effort, Fitzsimmons and Loomer (1978) summarized over sixty years of research in spelling instruction. The following are specific recommendations from their review:

Presenting spelling words in list form initially is a more successful method than presenting spelling words in sentence and paragraph form.

The words of highest frequency in child and adult writing should be studied by elementary school children.

The child correcting his own spelling test under the direction of the teacher is the single most important factor in learning to spell.

Spelling tests derived from the various curricular areas are of little value in increasing spelling ability.

Learning words by the whole-word method is a better technique than learning words by syllables.

Due to the nature of the English language, most attempts to teach spelling by phonic generalizations are questionable.

Time allotted for the study of spelling should be between 60 to 75 minutes per week.

The test-study method is superior to the study-test method when working with most spellers.

Writing words several times without intervening recall does not help insure spelling retention.

Wenzel (1977) reports that research on methods for building competency in spelling has yielded information in three areas: word selection, generalizations to be taught, and application of spelling skills to writing. First, research on word selection indicates that teachers should

chose basic, high-frequency words for children to learn to spell and give special attention to words that are persistently misspelled. Second, spelling generalizations should be taught in conjunction with the use of whole-word techniques. Third, it is essential to teach spelling in conjunction with functional writing.

Many classroom teachers welcome the effective characteristics listed above because they are directly applicable to the classroom. Future spelling programs should be firmly based on what is known to be of value in helping children learn to spell. The search continues for practical teacher-pupil activities in spelling instruction.

### Learning Disabilities

Interest in the component skills of basic spelling competency has increased with the problems presented by children with specific learning difficulties. Some authors (Irwin & Marge, 1972; McGrady, 1968) have claimed that as many as fifty percent of all LD students have language-related deficits.

Among the most commonly reported characteristics of learning disabled (LD) populations are deficits in learning and memory (Torgesen & Kail, 1980). Specifically, relative deficits have been seen in short and long-term memory,

memory search, and use of mnemonic strategies. (Cited in Mastropieri, Scruggs & Levin, 1985, p. 94).

"Some researchers (Hallahan & Reeve, 1980) have suggested that LD children generally demonstrate a two-to-three year developmental lag in memory tasks" (Mastropieri, Scruggs & Levin, 1985, p. 94). Torgesen (1980) speculated that LD children perform poorly on memory tasks because they have not developed effective rehearsal or elaborative strategies. As a result, certain tasks such as learning to spell become a "mindless" task of memorizing words which the student cannot later recall.

#### Memory and Mnemonic Techniques

"Memory is the re-creation of knowledge after a period of time during which you were not thinking of that knowledge. In other words, you were presented with certain information, some time passed during which your mind was occupied with other thoughts, and then you responded to some need to recall the information" (Kellett, 1980, p. 5). How can teachers develop a better memory in spelling for the LD student? Should they continue to practice memorizing the spelling of words so that memory gets stronger? Bellezza (1982), Brown (1977) and Kellet (1980), claim that this is

not the correct approach. "To consciously strain your memory only hinders rather than helps recall. Once you give your memory a clear direction it continues to work for you while you are attending to other matters" (Brown, 1977, p. 151). In other words, "When something has meaning, is understood and makes sense, it is easier to remember (Kellett, 1980).

Therefore, "To remember better, a person must develop memory "skill" not memory "strength." Memory is more like learning to solve a problem than it is like strengthening a muscle. Practice is necessary to better memorize, but it is very important to practice using specific memory [mnemonic] techniques" (Bellezza, 1982, p. 6).

The word mnemonic means "aiding the memory." Thus, a mnemonic device is a technique which aids the memory. Two mnemonic techniques (the keyword method and visual imagery) will be discussed and used in this study. However, there are three procedures that play a role in how these mnemonic techniques will work. They are (1) the use of memorized pegs to which new information can be attached in memory, (2) the use of visual imagery, and (3) the use of substitution techniques to make information that is difficult to remember, such as the spelling of abstract words, more easily memorized.

Bellezza (1982) describes the analogy of memory as being a large, floorless closet. His analogy is as follows:



Since new information cannot be stacked on the floor of the closet in neat piles as clothing, everything must be attached to pegs on the walls, otherwise the information disappears. Without training in mnemonic techniques our memory closet may have a great deal of wall space but not very many pegs. So one of the tasks ahead will be to create many more pegs to which additional information can be attached whenever necessary.

Once the additional pegs have been created, how can we be sure that the information attached to these pegs will remain there for a reasonable amount of time? This is where the principle of imagery comes in. The use of visual imagery ensures that information will be securely attached to a peg and remain there until it is later needed and can be retrieved. Visual imagery is like using the loop on an article of clothing to securely attach it to a peg on the wall of the closet. Sometimes, if we start running out of pegs, visual imagery can also be used to attach new information to information already attached to a peg, so that the information that has to be remembered is linked together to form a chain.

The final mnemonic principle that will be emphasized is the use of substitution techniques. It is not easy to form memorable images of numbers such as 158 or 8536. Also, it is not easy to form images out of meaningful but abstract words such as advantage or method. Because visual imagery plays such a large role in techniques of memorization, ways of substituting other words for abstract information should be formed for them so the abstract information is better remembered. Going back to the analogy of memory as a closet and new information as clothing that we want to store in the closet, the abstract numbers and words can be thought of as articles of clothing with no loops on them by which we can attach them to a peg. The substitution techniques are a way of adding a loop so that information can be stored. (p. 7).

Mnemonic devices, or systematic memory-enhancing techniques comprise an extremely potent and versatile class of associative-learning strategies. Associative mnemonic

techniques capitalize on what Levin (1983) referred to as the three R's: stimulus Recoding, semantic Relating, and systematic Retrieving, similar to Bellezza's idea of pegging, visual imagery and substitution mentioned above.

In the context of vocabulary learning, for example, in order to remember that the English word ranid means frog, ranid is first recoded as rain (an acoustically similar, familiar word that can be pictured). Next the "keyword" (Atkinson, 1975) rain is related to its meaning frog via a pictorial interaction such as a picture of a frog sitting in the rain. When the learner is subsequently asked to recall the meaning of ranid, a systematic retrieval path is available: ranid leads directly to the keyword rain, which leads directly to the picture of the frog in the rain, which in turn enables the response frog. This pictorial mnemonic technique and extensions thereof have consistently produced high levels of recall in nondisabled student populations (Hodges, 1984; McGivern & Levin, 1982; Negin, 1978; Pressley, Levin & Delany, 1982; Pressley, Levin, Kuiper, Bryant, & Michener, 1982).

Information may be associated visually (Alvermann, 1983; Hodges, 1984; Hartman, 1984; Higbee, 1979; Roberts & Ehri, 1983), or verbally (Hodges, 1984, Mastropieri, Scruggs, & Levin, 1985; Pressley Levin, & Delany, 1982; Pressley, Levin, Kuiper, Bryant, & Michener, 1982).

Sometimes the association is actually contained in the information given. Other times it is necessary to be somewhat creative to recognize the association that exists. This entails concentrating on a mnemonic association. This can be done verbally by getting information together in the form of a sentence or information can be connected by associating ideas together in a mental picture.

One key value of both verbal and visual associations is that one association can always be chained to another, so that any number of ideas can be triggered by one initial thought. The number of associations does not affect the memory, as the brain can process information with amazing rapidity. The important factor is the closeness of the association.

#### Brain Research and Art Education as they Relate to Visual Imagery

The research findings on right and left brain functions indicate that the two halves of the brain, the right and left hemispheres, process information differently. According to Levy (1977), this means that "Rather than being

a half-brained species, we are a two-brained species, each having its special mind" (p. 265).

"What we as educators need to do is to develop teaching methodologies which will effectively teach to both modes" (McCarthy, 1980, p. 73). Until the 1950's, neuroscientists supposed that since our language skills are almost entirely in the left brain, the left brain must be the dominant brain hemisphere. But more recently investigators have discovered that the right cerebral hemisphere plays a role just as important in learning and other activities as the language role played by the left brain (Fillmer & deKane, 1980; Gallant, 1976; McCarthy, 1980; Sinatra, 1983).

The basics for many mnemonic techniques is the linking together of pairs of words in memory. Words can be linked in memory by associating the visual images related to these words. Considerable evidence indicates that visual imagery/visualization (which occurs in the right hemisphere of the brain) can be especially helpful as it relates to remembering.

One experiment was designed by Grominger and Grominger (1982) to determine whether the effect of forming images for words to memorize is due to a by-product of image formation or to the direct involvement of images themselves. The results were interpreted as providing evidence for the

direct involvement of images in both the encoding and retrieval processes of words.

In two experiments performed by Cramer (1981), the effects of neutral, separate and interactive imagery instructions on the learning performance of first and fifth graders were compared for both single-item and paired-associative tasks. The investigation revealed that both younger and older children who reported using imagery did show facilitation.

Two separate experiments were performed to clarify the role that imagery plays in sentence understanding (Belmore, Yates, Bellack, Jones & Rosenquist, 1982; Eddy & Glass, 1981). Both results suggested that imagery plays a significant role in comprehension of high-imagery sentences. In addition, the first experiment concluded that imageability facilitates processing speed for both explicit and implicit aspects of meaning to approximately the same degree.

The following advice for the effective mnemonic use of visual imagery was given about 2,000 years ago in Ad Heremnum (circa 86-82 B.C.):

Now nature herself teaches us what we should do. When we see in everyday life things that are petty, ordinary, and banal, we generally fail to remember them, because the mind is not being stirred by anything novel or marvellous. But if we see or hear something exceptionally bias, dishonourable, unusual, great, unbelievable, or ridiculous, that we are likely to

remember for a long time... We ought then to set up images of a kind that can adhere longest in memory. And we shall do so if we establish similitudes as striking as possible if we set up images that are not many or vague but active; if we assign to them exceptional beauty or singular ugliness; if we ornament some of them, as with crowns or purple cloaks, so that the similitude may be more distinct to use; or if we somehow disfigure them, as by introducing one stained with blood or soiled with mud or smeared with red paint, so that its form is more striking, or by assigning certain comic effects to our images, for that too will ensure our remembering them more readily. (Yates, 1966, p. 9-10; cited in Higbee, 1979, p. 615-616).

These suggestions are still emphasized in current memory-training books, as the following examples show:

1. "Visualize clearly, and in vivid color. Colorful images are much easier to see and recall than drab ones" (Kellet, 1980, p. 10).
2. "Exaggerate. Tall-tales are more interesting and easier to remember than simple, factual stories. You will remember better when you enlarge things in your mind" (Kellet, 1980, p. 10).
3. "Picture in three dimensions. Your mind's eye is not as limited as a TV or movie screen. It can imagine in three dimensions, thereby making the images more lifelike. Don't worry about taking up space in your mind." (Kellet, 1980, p. 10).
4. "Imagine movement and action. We tend to visualize in still pictures. The more movement in your mental picture, the better you will remember it" (Kellet, 1980, p. 10).
5. "The images want to be as outstanding as possible and this can be helped by being humorous, colourful, sensual and imaginative in the linking of the images. Names can be easily remembered by linking the name with a prominent feature of the face" (Brown, 1977, p. 106.) "In a caricature drawing, the artist selects a facial feature that seems to stand out or characterize the person, and

exaggerates it. To do so entails the process of discrimination" (Kellet, 1980, p. 36).

When readers respond to the imagery of a passage, they mentally see, feel, hear, touch or smell in accord with the description. Much has been said and written about cognitive and affective learning. Unfortunately, little of this information has been translated to practical classroom use.

"The arts are the pre-eminent domain of affective learning, of learning through feeling, of involving feelings and imagination; of going into, beyond and around fact and clothing it with the human, personal significance without which facts are sterile" (Bookbinder, 1975, p. 796).

"Learning words and word usage without undergoing an experience is an exercise in futility. Only experience can give substance to learning and making understanding possible. This is where the art experience is predominantly significant. In working through the tangible substances of art media, students constantly touch, shape, alter, join and build. There is a complete involvement of the senses, of thoughts, feelings and imagination" (Bookbinder, 1975, p. 796). "Inversely, some of the objectives attributed to art are the means of making visual thinking possible" (Arnheim, 1969, p.254).

Several recent studies have suggested that drawing activities improve the communication skills of elementary pupils (Durkin, 1966; Fenwick, 1978; Platt, 1977).



A strategy described by Miccinatti (1981), for enhancing students' ability to create images, is the construction of stick figures following the presentation of a passage.

Brittain (1979) observed from studies conducted at Cornell University that when children talk about their drawings with an adult, the children use the drawing as a reference point. More importantly, communication was going on not so much with the adult, but the child was using the drawing to communicate with himself. Brittain concluded that:

drawing...could be an excellent means of facilitating cognitive development, the means through which a child organizes his concepts so that they become understandable to him and become assimilated into his intellectual functioning (p. 184).

Brown (1977) explains the reason for this. It is because "the picture, the image, is a very basic language. It's the language you knew first. You could see and remember images before you learned verbal language" (p. 118).

A picture is worth a thousand words. The meaning of a picture can be comprehended in a single glance, instantaneously and holistically and recorded that way in the brain. Because of their concreteness, pictures increase the availability of imagery in recall (Paivio, 1979). In other words, the visual imagery a person remembers due to pictorial input is recalled more rapidly, more holistically



than the words the person uses to describe the images he or she is remembering. Thus, "when teachers couple a visual mode of presentation with associated verbal explanation, they provide a powerful means for increasing learning through the dual interaction of hemispheric input" (Sinatra, 1983, p. 198). Sinatra cites that research conducted by Dimond (1971) and Dimond and Beaumont (1971) verified this. "They showed that a greater learning output was achieved when both brain hemispheres rather than one were activated in learning tasks" (Sinatra, 1983, p. 199).

Wittrock (cited in Gallant, 1976, p. 50) too, feels that both approaches, verbal and nonverbal materials should be used whenever this seems desirable. In this way both brains would be reached, each in its own special language. He conducted a study to find out which of three ways of teaching children the meaning of words was the best: (1) using only words, having the children read and write the words and their definitions; (2) having the children read the definition of each word and then trace a given picture of each definition; (3) having the children read the definition of each word and then draw their own picture of the definition. He found that the children remembered the definitions best when they drew their own picture of the definitions; that is, when they used a combination of the

right brain (drawing pictures) and the left brain (reading the definitions). They did poorest when they used only the left brain, or read the definitions.

### The Keyword/Keyphrase Method

In the last decade, the mnemonic keyword method, a strategy which reaches both brain hemispheres, has been thoroughly researched (Belleza, 1982; Hartman, 1982; Hodges, 1984; Mastropieri, Scruggs, Levin, Gaffney & McLoone, 1984; McGivern & Levin, 1982; Pressley, Levin & Delaney, 1982; Pressley, Levin, Kuiper, Bryant, & Michener, 1982). The method as proposed by Atkinson (1975) consists of two distinct stages: the acoustical link stage (left brain activity) and the imagery link stage (right brain activity). As an example of what this means, Bellezza (1982) introduced an early use of the keyword procedure: the memorization of the English equivalents of foreign-language vocabulary. He described how the keyword technique is used to remember that the English meaning for the Spanish word perro (pronounced PEAR-oh) is dog.

You would first think of an English word that sounds like perro, perhaps the word pear. Going from the meaningless word perro to an English word that sounds like it is called the phonetic link.

Not only should this keyword sound like perro, it should also be an English word that represents a concrete object

and can be easily imaged. The reason for this is that in the next step, the imagery link, a visual image is formed containing a pear and a dog. For example, a mental image may be formed of a big pear being eaten by a dog. Now the next time the word perro is seen or heard, it should remind you of the keyword pear through the phonetic link. Forming a visual image of a pear will then give you the word dog through the visual link (Bellezza, 1982, p. 63-64).

To date, the bulk of the keyword research has focussed on several material-and-procedural variations associated with the method. A comprehensive survey of the research on the effectiveness of the keyword method appeared recently in an article entitled: The Mnemonic Keyword Method (Pressley, Levin, & Delaney, 1982). The article reviewed a number of studies where subjects using the keyword method have been better able to recall the definitions of vocabulary words than have subjects in two types of control conditions. In no-strategy control conditions, subjects were left to their own devices to learn the vocabulary words. In repetition control conditions, subjects were instructed to say the words and their meanings over and over to themselves. In addition, benefits of mnemonic instruction have recently been reported for both academically precocious children (Pressley, Levin, Kuiper, Bryant & Michener, 1982) and children with below average reading and language skills (Mastropieri, Scruggs, Levin, Gaffney & McLoone, 1985) in

vocabulary-learning. Bellezza (1982) suggests that the keyword mnemonic can also be used in learning the correct spelling of words found difficult to spell. He describes how to use keyword mnemonics in remembering to spell across with one C rather than two. He follows these steps:

1. Create a keyword or a key phrase that is phonetically similar to the word to be spelled. Try to make the keyword or key phrase represent concrete objects that can be mentally pictured. For across, I may form the keyword cross.
2. Form a sentence using the keyword and other words. These other words should contain the same letter sequences as those found in the word that you are trying to spell. Concentrate on finding words that contain the same letter sequences that make the word difficult for you to spell. Try to make as many of these words as possible represent concrete objects. For example, for the word across I use the sentence "I see a cross." Sometimes, adding the word to be spelled to the sentence is possible and may help you remember the sentence, such as, "I see a cross across the street."
3. Form as good an image as possible from the mnemonic sentence so that you will think of the image when you hear the keyword.
4. Note your image for detail, color and interaction. Bellezza (1982) gives four more examples that further illustrate how spelling mnemonics work. The underlined letters in the word are the letters difficult to remember.

villain:villa - The villain was in the villa.  
business:sin - Business is no sin.  
piece:pie - I want a piece of pie.  
annual:Ann - Ann, you, and Al are invited  
to the annual picnic. (p. 72).

Only one study addressed the use of the keyword technique (referred to as an associative learning technique) in helping students learn to spell difficult words. A list

of spelling demons (commonly misspelled words) was administered each week to both groups of students. The control group was instructed to write each word in a meaningful sentence, underline the difficult part of the target word, and rehearse its spelling in preparation for a quiz. The mnemonic group was familiarized with an associative learning technique for linking the difficult part of each word to its correct spelling, whereby sentence construction would provide specific memory cues intended to make retrieval more efficient. Each Monday the students were quizzed on their ten words, and after eleven weeks the students were administered a sixty word spelling test. The results showed there was no significant differences between the two groups on the weekly quizzes. However, on the test administered during the tenth week, the mnemonic group scored significantly higher than the control group. This indicates that mnemonic training effects long-term memory and retention. This also suggests that verbal storage and retrieval of associations was more durable and efficient than simple visual memory.

In contrast, little attention has been paid to the question of whether the keyword method is equally effective for learning disabled students in helping them remember how to spell difficult words.

### Summary

Many students perform inadequately in school because they use ineffective techniques to memorize the information they are asked to learn. In addition, their learning may be hindered because the brain as a whole is not involved in accomplishing the memorization task. It is obvious that something must be done before these students finish their education and are faced with failure. The literature reviewed in this chapter indicates the importance of a spelling program in which educational procedures involve the whole brain.

Based on the significant findings of research involving visual imagery (in this case self-generated drawings of images) and keyword method, it is not premature to conclude that these two techniques are highly effective strategies for remembering new vocabulary as well as other factual information with an associative component. These two methods need to be investigated in conjunction with one another.

## Chapter III

### Design of the Study

The study was designed to analyze the effectiveness of using mnemonic devices, particularly the keyword method and self-generated drawings of visual images to correctly spell difficult words.

### The Hypotheses

The following null hypotheses were investigated in this study:

1. There is no significant difference in the spelling ability of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group.
2. There is no significant difference in the spelling ability of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group in applying correctly spelled words in a dictated paragraph.

### Methodology

#### Subjects

The study included 31 learning disabled students from a suburban school class consisting of 6th, 7th, and 8th grade students. The subjects were divided into a mnemonic group and a non-mnemonic/control group. The mnemonic group consisted of eight boys and four girls. The non-mnemonic/control group consisted of ten boys and nine girls.

The TWS (Test of Written Spelling) was administered to each of the 31 subjects as a pretreatment equivalency measure.

A t-test was performed to assure that there was no significant difference in spelling ability of the two groups.

#### Instruments and Procedure

Each student was administered a spelling test consisting of the 1,000 most commonly used words in the English language (Fry, Polk, Fountoukidis, 1984, p. 22-28). The words were ranked in order of frequency of occurrence. The 1,000 Instant Words test was administered orally in a small group situation. Fifty of the 1,000 words were administered during their designated language arts class on each of 20 consecutive school days. A separate list which contained the first 100 misspelled words from this pretest were selected for each student independently.

The mnemonic group received four hours of instruction familiarizing them with the two associative learning techniques for linking the difficult part of a word to its correct spelling. One-half hour sessions on eight consecutive days were conducted. This instruction consisted of the first three steps of the keyword method listed by Bellezza (1982, p. 71). The third step was altered in that each student was required to not only form an image of the mnemonic sentence, but also draw his/her image on a piece of



paper. See Appendix A for samples illustrative of what was done in the group.

A ten-item evaluation test which consisted of the first ten words from the 1,000 Instant Words test (which were not used in the actual study) was given on the ninth day to reveal that the mnemonic instruction had satisfied the predetermined criteria for success: at least eighty-five percent of the students achieved ninety percent success. If the criteria for success had not been reached at that time, an additional 4 hours of instruction would have been conducted with the next 10 words from the 1,000 Instant Words test. (These words would have also been omitted from the actual study.) The sessions would have been conducted the same as before and a ten-item evaluation test consisting of those ten words would have been administered. The training would have continued each time with the next consecutive words from the 1,000 Instant Words test until the criteria for success was reached on the ten-item evaluation test.

For ten consecutive weeks, the language arts teachers presented the individualized word lists to both groups separately. Subjects were informed that the following schedules were to be followed for each group respectively and that a posttest would be administered at the beginning of the class every Friday. The first phase of the schedules were as follows:

Mnemonic Group

- Monday: compare the correctly spelled word to your incorrect spelling of the word and locate, by underlining, the trouble-spot in the correctly spelled-word.
- : rewrite the correctly spelled word and capitalize the letter sequence(s) that indicate where the spelling error occurred.
- : homework assignment: create a sentence using a keyword or key phrase that contains the sequence of letters that indicate the trouble-spot and the actual spelling word.
- Tuesday: review each sentence with your teacher to check for error in the usage of the keyword or with the mechanics of the sentence.
- : homework assignment: on a 5"x8" piece of paper write the correctly spelled word in the top middle section of the paper. Be sure to capitalize the trouble spot. Across the bottom of the page, rewrite the sentence contain the keyword or phrase and the spelling sentence. Underline the keyword or phrase once and the spelling word twice.
- Wednesday: review each 5"x8" piece of paper containing the spelling word and mnemonic sentence with your teacher.
- : homework assignment: draw to the best of your ability (you may use stick figures) the visual image you formed in your mind for the mnemonic sentence.

Thursday: fold back the top section (including your spelling word) and the bottom section (including the mnemonic spelling sentence) on each 5"x8" piece of paper and hand them to your teacher. The teacher will hold up your drawing and read the mnemonic sentence you constructed. You are to tell her the spelling word and the keyword based on the picture you see in front of you and the mnemonic sentence you heard your teacher read to you. Lastly, orally spell the word or write it down on scrap paper, whichever way you feel more comfortable with. Once you have correctly spelled each word, you are ready to take the spelling test on Friday.

Friday: Spelling test on ten words studied this week. Test administered on a cassette tape made by the teacher. The papers were immediately collected and graded by the language arts teacher.

Non-Mnemonic/Control Group

Monday: the students were given a list of 10 spelling words that they had misspelled on the 1,000 word pre-test and told to put the words in alphabetical order and to write each word five times.

Tuesday: the students looked up each spelling word in the dictionary and wrote down (a) the entry word broken up in syllables, (b) the word without the syllables, (c) the guide words on that page and the page number each was found on.

Wednesday: the students were given a spelling test and required to write each misspelled word 10 times each.

Thursday: the students used and wrote each spelling word in a sentence.

Friday: the students were given a teacher-made ditto and asked to unscramble each spelling word.

: the students were given the final spelling test and told to write each misspelled word twenty times.

On Monday of the eleventh week, the second phase of the study began. A dictation test was administered to see if spelling competency was transferred to functional writing. Each child was again given a tape recorder and cassette on which 25 randomly chosen words of the 100 target words previously studied were compiled to make a 5-10 sentence summary paragraph. All tests were graded by the language arts teacher to see if the spelling words were correctly spelled within the paragraph. All other words in the paragraph were disregarded at this time.

No other spelling instruction was given during the eleven weeks of the experiment.

#### Analysis of Data

Posttest scores from the mnemonic group and the non-mnemonic/control group were compared to determine the effectiveness of mnemonic training on spelling.

A .05 level of significance was used to examine the

hypotheses in the study. Three separate t tests were performed for the different phases of the study. The dependent variable for the first phase of study was the mean scores of the set of each group's average scores for the ten-item Friday quizzes. The dependent variable for the second phase of investigation was the mean of each group's scores on the individualized twenty-five item dictation test.

### Summary

This study was designed to investigate the effectiveness of a visual-verbal mnemonic method versus the traditional spelling method on classroom spelling achievement. One pretest and two posttests were used as evaluating devices. Mean gain scores were examined for all tests. A two tailed t test was used to seek significant differences between the mnemonic and non-mnemonic/control group.

## Chapter IV

### Findings and Interpretations

#### Purpose

The purpose of this study was to investigate the effectiveness of mnemonic training on the spelling abilities of 6th, 7th, and 8th grade learning disabled students.

#### Analyzing the Findings and Interpreting the Data

The following null hypothesis were investigated in this study:

1. There is no significant difference between the spelling abilities of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group.
2. There is no significant difference in the spelling ability of those students receiving instruction through a mnemonic approach compared with those in a non-mnemonic group in applying correctly spelled words in a dictated paragraph.

To verify that students in both conditions were comparable on spelling ability, their performance on the Test of Written Spelling was subjected to a t test of independent means (one-tailed). As indicated in Table 1, the two groups did not differ significantly on any of the measures.

Table 1

Means, Standard Deviations, and  $t$  test for Scores  
of the Test of Written Spelling

<u>Item</u>	<u>Mnemonic Group</u>		<u>Non-Mnemonic Group</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Predictable Words	23.58	5.16	23.00	5.96
Unpredictable Words	9.67	5.05	9.00	5.10
Total Score	33.25	9.72	32.00	10.42
<u>t value:</u>	Predictable Words : .2813935 Unpredictable Words: .359288 Total: .3367463			

Required  $t$  value: 1.699,  $p < .05$

Since the  $t$  required for 29 degrees of freedom at the  $p < .05$  level (one-tailed) is 1.699, and since the  $t$  obtained was .3367463, the null hypothesis was accepted and it was concluded that the treatment group's mean performance on the pretest was not significantly better than the control group's performance.

The first question this study was designed to answer was whether or not a mnemonic strategy that required disabled students to use the keyword in conjunction with the visual imagery mnemonic device to spell difficult words would be more effective than a mnemonic free strategy. Table 2 shows the

results of the mean performance of each group on the ten weekly spelling posttests. Mean values for the two conditions (mnemonic and non-mnemonic) indicated that students who were required to use the keyword and visual imagery mnemonic devices did not correctly spell significantly more words than their non-mnemonic counter parts.

Table 2

Means, Standard Deviations and  $t$  test for Scores for the Ten Weekly Tests

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The 12 Scores For The Mnemonic Group:

9.70	9.70	9.60	9.40	9.20	9.20
9.20	9.00	9.00	8.90	8.30	7.30

The 19 Scores For The Non-mnemonic Group:

10.00	10.00	9.90	9.80	9.80	9.34
9.25	9.25	9.20	9.20	8.90	8.80
8.80	8.70	8.60	8.30	7.80	7.70
6.60					

---

<u>Item</u> <u>Group</u>	<u>Mnemonic Group</u>	<u>Non-Mnemonic</u>
N	12	19
Mean	9.0417	8.9442
Standard Deviation	0.6735	0.8842
Obtained $t$ score	-0.3260	
<hr/> Required $t$ value: 1.699, $p < .05$		



Since the  $t$  required for 29 degrees of freedom at the  $p < .05$  level (one-tailed) is 1.699, and since the  $t$  obtained was -0.3260, the null hypothesis is retained. The treatment group's mean performance on the posttests was not significantly better than the control group's performance.

The second question this study was designed to answer was whether or not there would be a significant difference in the transfer of correctly spelled words to functional writing between learning disabled students in the mnemonic group and the non-mnemonic group. Table 3 shows the results.

Table 3

Means, Standard Deviations of and  $t$  test for  
Scores of The Functional Writing Posttest

The 12 Scores For The Mnemonic Group:

20	19	19	17	16	16
13	13	13	12	12	12

The 19 Scores For The Non-Mnemonic Group:

22	20	19	17	17	15
14	13	13	12	11	11
10	10	10	10	9	7
5					

<u>Item</u>	<u>Mnemonic Group</u>	<u>Non-Mnemonic Group</u>
N	12	19
Mean	15.17	12.89
Standard Deviation	3.04	4.50
Obtained $t$ score	-1.5379	
Required $t$ value:	1.699, $p < .05$	

Since the  $t$  required for 29 degrees of freedom at the  $p < .05$  level (one-tailed) is 1.699, and since the  $t$  obtained was -1.5379, the null hypothesis is accepted. The treatment group's mean performance on the posttest was not significantly better than the control group's performance.

#### Summary

The findings in this chapter suggest that spelling development utilizing either method (mnemonic or traditional instruction) was successful. There were no significant differences between the two methods.

## Chapter V

### Conclusions and Implications

#### Purpose of the Study

The purpose of this study was to investigate the effectiveness of mnemonic training on the spelling abilities of 6th, 7th, and 8th grade learning disabled students.

#### Conclusions

Analysis of the data indicates no significant differences between the two methods of spelling instruction on either the mean performance of the ten weekly spelling tests or on the functional writing test.

The spelling skills of all students in both groups improved on the weekly tests. This suggests that both methods were similarly effective on spelling abilities. For the mnemonic group, these gains could possibly be attributed to the high level of student and teacher interest to the introduction of a new method of spelling instruction.

For the non-mnemonic group, these gains could possibly be attributed to the second pretest administered on the Wednesday of each week. This basically gave the students an extra chance on the weekly Friday posttests. On Wednesday, the students found out what they still could not spell and

could therefore prepare for Friday's test by studying these words at greater length.

#### Implications For Classroom Use

The reaction from both teacher and students to the mnemonic devices has been remarkably positive. Many students have expressed delight at being shown a strategy that allowed them to avoid the drudgery of rote rehearsal. Some students also have reported that the humor incorporated into several of the key pictures and sentences made the classes more interesting and enjoyable.

Use of the mnemonic strategies also provided an unexpected benefit in the classroom. Prior to the development of this strategy, when a student was unable to remember the spelling of a particular word, the instructor had two choices: either produce the spelling for a student, or ask another student to produce the spelling. Regardless of what choice was made, the result was failure for the student who couldn't produce the correct spelling. However, with the use of the mnemonic strategies, there is now another alternative. The instructor can provide a keyword or phrase associated with the trouble spot in the word which could help the student to discover the correct spelling on his own and overcome his/her failure.

A mnemonic (visual-verbal) approach to spelling improvement can be a creative, diverse change from the more

traditional methods. Such a method could be effectively implemented in conjunction with other spelling exercises. Student interest and motivation are two critical factors affecting academic success.

Perhaps this mnemonic approach will affect spelling ability and facilitate both of these concerns. Each student could possibly experience some degree of success and self-satisfaction with this approach as each is required to share his/her personal drawings and sentences with the teacher or another student. Students assist one another and exchange their feelings and views on selected pictures or drawings. Furthermore, this approach requires each student to examine his/her own spelling errors and then alter them by attending to the correct spelling. Perhaps this helps him/her gain important knowledge of the regularities underlying the spelling system.

Basically, the use of these mnemonic devices may have implications for school instruction in two general ways. First, this type of instruction can best present information to students to help learning and retention (e.g., it's more concrete vs. abstract, it's more pictorial vs. verbal, it causes the student to relate the unknown to what is known, and it causes the student to make the facts interact with one another vs. learning separate bits of information). Secondly, this kind of activity can be taught to increase

the student's learning power by making visual associations, verbal elaborations, and by drawing pictures to make their mental images more concrete.

#### Implications For Research

Further research can investigate the following areas:

This study might be extended for a longer period of time to effectively determine the impact of the mnemonic approach versus the non-mnemonic approach on spelling ability.

A larger testing population could be utilized particularly when dealing with learning disabled students. The research identifying learning-disabled children indicates that their learning has been impaired both in specific areas of verbal and/or non-verbal learning, but their potential for learning is categorized as normal or above. Since each child's deficits can fall in many different categories, it would be wise to use a much larger sample to determine the effectiveness of the mnemonic method.

Thirdly, since the mnemonic method requires practice in order for it to be effective, a ten-week teaching period might have been too short a period of time for each subject to gain full use of its effectiveness. It might be wise to train the students in the treatment group for a longer period of time (possibly ten weeks), and then conduct the actual comparative study.

In examining the words there are those which did not contain keywords within them. This required the student to generate a key phrase instead of a single keyword. The subjects would be expected to be at a disadvantage, relative to how well the key phrase was integrated and therefore remembered. In further research, this could be eliminated by having the examiner choose words that contain keywords within them.

The strategies and procedures described here deserve more extensive experimental study. There is one important criterion to be observed in any educational study that might be made. Surely the final test of any system is how well the students apply what they have learned in many situations over a period of time. It is difficult to measure this in a research investigation. The single criterion of performance on one dictated paragraph consisting of a sample of the already studied spelling words on one occasion is totally unlike those conditions of a real situation. One possible way to help get around this is to alter the administration of the weekly spelling posttests. Instead of testing the words in isolation, the examiner could dictate a paragraph or series of sentences that utilize the weekly spelling words. This would also familiarize the student with the way the posttest would be administered. Besides, these conditions are more like a real situation.

### Summary

The basic goal of this study was to determine the effectiveness of mnemonic devices versus a non-mnemonic method on spelling ability. This study was initiated to seek alternative methods to a more traditional way of spelling instruction. The analysis of the data revealed that there was no significant difference between the two methods of instruction. Both groups did, however, exhibit gains on the weekly spelling test scores.

The research indicates a need for spelling instruction that offers a child diversity and creativity in full use of the brain's capacity. The mnemonic approach to spelling instruction can offer teachers such a change from the more traditional methods of spelling instruction.



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